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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,427	12/10/2001	Kimon D. Roufas	D/A1131 XER 2 0441	9522
7590	12/16/2003		EXAMINER	
Mark S. Svat Fay, Sharpe, Fagan, Minnich & McKee, LLP 7th Floor 1100 Superior Avenue Cleveland, OH 44114-2518			LAUCHMAN, LAYLA G	
			ART UNIT	PAPER NUMBER
			2877	
DATE MAILED: 12/16/2003				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/016,427	Applicant(s) ROUFAS ET AL.	
	Examiner L. G. Lauchman	Art Unit 2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
     \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
     a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____.  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____. | 6) <input type="checkbox"/> Other:  |

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-20 are rejected under 35 U.S.C. 102(a) as being anticipated by K. Roufas, Y. Zhang, D. Duff, M. Yim “Six Degree of Freedom Sensing for Docking Using IR LED Emitters and Receivers” *Experimental Robotics VII*, Lecture Notes in Control and Information Sciences 271, D. Rus and S. Singh Eds. Springer, January 2001.

As to Claim 1, the reference discloses an alignment system including (read pp. 91-100): a first module; a first plurality of emitters located at defined locations on a face of the first module, positioned to emit signals of a known intensity distribution away from the face of the first module; a first receiver configuration located on the face of the first module, having a known sensitivity distribution; a second module; a second plurality of emitters located at defined locations on a face of the second module, positioned to emit signals of a known intensity distribution away from the face of the second module; a second receiver configuration located on the face of the second module, having a known sensitivity distribution (see Figs 2 and 7, Ch. 2. pp92-93); a trigger signal generator configured to fire the first plurality of emitters of the first module in a predetermined pattern to generate signals sensed by the second receiver configuration

of the second module, and to fire the second plurality of emitters of the second module in a predetermined pattern to generate signals sensed by the first receiver configuration of the first module (pp.93-94).; a converter configuration arranged to obtain and convert the signals received by the first and second receiver configurations into data representative of the signals sensed by the receiver configurations; and a processing system configured to receive the data from the converter configuration, and to compute an offset between the faces of the first and second modules (pp.93-94).

As to Claim 2, the article discloses everything as applied to Claim 1, and in addition the offset is a six degree offset between the first module and the second module (see Ch.4, pp. 95-96).

As to Claim 3, the article discloses everything as applied to Claim 1, and in addition the computed offset is at least one of an absolute offset or a relative offset (pp 96-97).

As to Claim 4, the article discloses everything as applied to Claim 1, and in addition the first and second modules have at least six degrees of movement in the x, y, z, pitch, roll and yaw directions (p 92, first paragraph).

As to Claim 5, the article discloses everything as applied to Claim 1, and in addition the offset information is used to align the first module and the second module (Ch.4, p. 95).

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As to Claim 6, the article discloses everything as applied to Claim 1, and in addition the face of the first module further includes the plurality of first emitters being located at edges of the face, the first receiver configuration including first and second receivers located at approximately the mid-line and center of the face, and wherein the face of the second module further includes having the plurality of second emitters being located at corners of the four sided face, the second receiver configuration including first and second receivers located at approximately the mid-line and center of the face (Ch. 4, pp. 95-96).

As to Claim 7, the article discloses everything as applied to Claim 6, and in addition the plurality of first emitters are four emitters located at edges of the face, and the plurality of second emitters are four emitters located at edges of the face (Ch. 4, pp. 95-96).

As to Claim 8, the article discloses everything as applied to Claim 1, and in addition the face of the first module further includes having the first plurality of emitters and the first receiver configuration on the face of the first module consisting of emitter/receiver combinations at predetermined locations, and wherein the face of the second module further includes having the second plurality of emitters and the second receiver configuration on the face of the second module consisting of emitter/receiver combinations at predetermined locations (Ch. 4, pp. 95-96).

As to Claim 9, the article discloses everything as applied to Claim 8, and in addition the

emitter/receiver pairs of the first module face and the emitter/receiver pairs of the second module face are configured wherein movement of the face plate of the first module toward the face plate of the second module results in a change in intensities of emitter signals received by the receivers of the first and second face plates (Chapter 4, pp. 95-99) .

As to Claim 10, the article discloses everything as applied to Claim 9, and in addition the locations of the emitter/receiver pairs of the first and second face plates have a symmetry which permits alignment between the first and second modules when the modules are rotated with respect to each other (Chapter 4, pp. 95-99).

As to Claim 11, the article discloses everything as applied to Claim 1, and in addition the face of the first module and the face of the second module are configured to have a change in intensities of emitter signals as the modules move toward each other (Chapter 4, pp. 95-99).

As to Claim 12, the article discloses everything as applied to Claim 1, and in addition the first module and the second module are modules of a modular reconfigurable robotic system (Ch. 1, p.91 and Chapter 4, pp. 95-99) .

As to Claim 13, the article discloses everything as applied to Claim 1, and in addition the first and second pluralities of emitters are commercial-off-the-shelf (COTS) infrared

(IR) light emitting diodes, and the first and second receiver configurations are commercial-off-the-shelf (COTS) infrared receivers (pp 91-92).

As to Claim 14, the article discloses everything as applied to Claim 1, and in addition the first receiver configuration and the second receiver configuration detects ambient signals (Ch. 2)

As to Claim 15, the article discloses everything as applied to Claim 1, and in addition the processing system computes six degree offset through at least one of absolute position sensing and relative offset sensing (Chapters 4.1 and 4.2).

As to Claim 16, the reference discloses a method comprising (read pp. 91-100): configuring a first face of a first module to have a first plurality of emitters of a known intensity distribution, and a first receiver configuration having a known sensitivity distribution; configuring a second face of a second module to have a second plurality of emitters of a known intensity distribution, and a second receiver configuration having a known sensitivity distribution; activating the first plurality of emitters (see Figs 2 and 7, Ch. 2. pp. 92-93); detecting by the second receiver configuration a first set of signals from the first set of emitters; activating the second plurality of emitters; detecting by the first receiver configuration a second set of signals from the second set of emitters (pp.93-94) converting the first set of signals received by the first receiver configuration and the second set of signals received by the second receiver configuration, to digital

data representative of the first and second sets of signals (pp.93-94); and processing the digital data to compute an offset between the face of the first module and the face of the second module(pp.93-94).

As to Claim 17, the article discloses everything as applied to Claim 16, and in addition the offset is a six-degree offset between the first module and the second module (see Ch.4, pp. 95-96).

As to Claim 18, the article discloses everything as applied to Claim 16, and in addition movement of the first face plate toward the second face plate results in a change in intensities of emitter signals received by the receivers (Chapter 4, pp. 95-99).

As to Claim 19, the article discloses everything as applied to Claim 16, and in addition the first and second modules have at least six degree freedom of movement (pp 96-97).

As to Claim 20, the article discloses everything as applied to Claim 16, and in addition the locations of the emitter/receiver pairs of the first and second face plates have a symmetry which permits alignment between the first and second modules when the modules are rotated with respect to each other (Ch. 4, pp 95-96).



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**Conclusion**

Papers related to this application may be submitted to Technology Center 2800 by facsimile transmission. Papers should be faxed to TC 2877 via the PTO Fax Center located in CP4-4C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Center number is (703) 872-9306.

If the Applicant wishes to send a Fax dealing with either a Proposed Amendment or for discussion for a phone interview then the fax should:

a) Contain either the statement "DRAFT" or "PROPOSED AMENDMENT" on the Fax Cover Sheet; and

b) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to L. G. Lauchman whose telephone number is (703) 305-0071.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC receptionist whose telephone number is (703) 308-0956.

A handwritten signature in black ink, appearing to read 'L. G. Lauchman', with a stylized, flowing script.

L. G. Lauchman  
Patent Examiner  
Art Unit 2877  
11/25/03/lgl